

WHAT IS CLAIMED IS:

1. A system for controlling an internal combustion engine having a plurality of cylinders and mounted on a vehicle, comprising:

5 an engine operation controller that conducts a switching control of engine operation based on a load of the engine between a full-cylinder operation in which all of the cylinders are operative and a cut-off cylinder operation in which some of the cylinders are inoperative; and

a running controller that conducts a running control of the vehicle;

10 wherein the engine operation controller switches engine operation to the full-cylinder operation when it is determined that deceleration is required by the running controller.

15 2. A system according to claim 1, wherein the running controller conducts the running control that includes at least one of a cruise control in which the vehicle runs at a desired vehicle velocity and a preceding vehicle follow-up control in which the vehicle runs at a desired vehicle velocity to maintain a desired inter-vehicle distance from a preceding vehicle.

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25 3. A system according to claim 1, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when a device that is manipulated by an operator to input the instruction to decelerate the vehicle is kept manipulated for a predetermined period of time or more.

4. A system according to claim 2, wherein the engine operation controller

determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when a difference between a detected vehicle velocity and the desired vehicle velocity is equal to or greater than a predetermined value.

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5. A system according to claim 2, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when change of the desired vehicle velocity is equal to or greater than a predetermined value.

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6. A system according to claim 2, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation if change of the desired vehicle velocity is equal to or greater than a predetermined value when the preceding vehicle follow-up control is in progress.

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7. A system according to claim 1, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when a gradient of a road on which the vehicle runs is equal to or less than a predetermined gradient threshold value.

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8. A system according to claim 1, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation if a throttle valve is fully closed or is almost

fully closed when the running control is in progress.

5 9. A system according to claim 1, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when an accelerator pedal is not manipulated by an operator.

10 10. A system according to claim 1, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when a supply of fuel to the engine is cut off.

15 11. A system according to claim 1, wherein the engine operation controller switches engine operation to the cut-off cylinder operation when it is determined that deceleration is not required by the running controller, after switching engine operation to the full-cylinder operation.

20 12. A method of controlling an internal combustion engine having a plurality of cylinders and mounted on a vehicle, comprising the steps of:

conducting a switching control of engine operation based on a load of the engine between a full-cylinder operation in which all of the cylinders are operative and a cut-off cylinder operation in which some of the cylinders are inoperative; and

25 conducting a running control of the vehicle;

wherein the step of engine operation control switches engine operation to the full-cylinder operation when it is determined that deceleration is required by the step of

running control.

5 13. A method according to claim 12, wherein the step of running control conducts the running control that includes at least one of a cruise control in which the vehicle runs at a desired vehicle velocity and a preceding vehicle follow-up control in which the vehicle runs at a desired vehicle velocity to maintain a desired inter-vehicle distance from a preceding vehicle.

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14. A method according to claim 12, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when a device that is manipulated by an operator to input the instruction to decelerate the vehicle is kept manipulated for a predetermined period of time or more.

15 15. A method according to claim 13, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when a difference between a detected vehicle velocity and the desired vehicle velocity is equal to or greater than a predetermined value.

20 25 16. A method according to claim 13, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when change of the desired vehicle velocity is equal to or greater than a predetermined value.

17. A method according to claim 13, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation if change of the desired vehicle velocity is equal to or greater than a predetermined value when the preceding vehicle follow-up control is in progress.

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18. A method according to claim 12, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when a gradient of a road on which the vehicle runs is equal to or less than a predetermined gradient threshold value.

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19. A method according to claim 12, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation if a throttle valve is fully closed or is almost fully closed when the running control is in progress.

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20. A method according to claim 12, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when an accelerator pedal is not manipulated by an operator.

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21. A method according to claim 12, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when a supply of fuel to the

engine is cut off.

- 5 22. A method according to claim 12, wherein the step of engine operation control switches engine operation to the cut-off cylinder operation when it is determined that deceleration is not required by the step of running control, after switching engine operation to the full-cylinder operation.